

COMMENTS AND RESPONSE

In view of the comments below, Applicants respectfully requests that the Examiner reconsider the present application including rejected claims, as amended, and withdraw the claim rejections.

Information Disclosure Statement

The Examiner noted that the information disclosure statement filed on November 6, 2000, fails to comply with 37 C.F.R. §§ 1.97 and 1.98, and MPEP § 609 because a list of pending applications is provided. Applicants acknowledge that this citation has been placed in the application file, but that the information therein has not been considered.

Abstract

The Examiner objected to the disclosure because of an informality in the abstract. In particular, the Examiner required that line 17 of the abstract be deleted.

By this response, Applicants have amended the Abstract as suggested by the Examiner. Applicants therefore request that the Examiner withdraw the objection to the disclosure based on the abstract.

Specification

The Examiner objected to the specification based on a number of informalities. In particular, the Examiner required the status of cited applications be updated. Specifically, the Examiner required that the designation “XX/XXX,XXX” be replaced with the correct application serial number as appropriate. By this response the applicants have made the appropriate amendments to fill in all known serial numbers.

In addition, Applicants have also amended the specification to correct a few minor errors in the BRIEF DESCRIPTION OF THE DRAWINGS.

For at least the reasons given above, applicants submit that all of the informalities noted by the Examiner have been corrected. Applicants therefore respectfully request that the Examiner withdraw the objection to the specification.

Objection to the Claims

The Examiner has objected to claims 11, 30, 54, and 82 because of an informality in their recitation, and has objected to claims 19 and 63 because the variables L, m, K, and s are undefined.

In response to this objection, Applicants have amended claims 11, 30, 54, and 82 to recite that "said amplified incoming UWB signal is used as said incoming UWB signal in said step of analyzing."

In addition, Applicants have amended claims 19 and 63 to define the terms L, m_1 , K, and s_1 . Support for this amendment comes, for example, from the specification on page 32, lines 1-22.

For at least the reasons given above, applicants respectfully request that the Examiner withdraw the objection to claims 11, 19, 30, 54, 63, and 82.

Claim Rejections 35 USC § 102

The Examiner has rejected claims 1-6, 12-17, 20-25, 31-49, 55-61, 64-77, and 83-88 under 35 U.S.C. § 102(e) as being allegedly anticipated by United States Patent No. 6,437,832 to Grabb et al. ("Grabb"). Applicants respectfully traverse this rejection.

Regarding claims 1, 20, and 36, Grabb discloses an ultra wide band (UWB) digital television (DTV) overlay signal in which a cross-correlator 108 cross-correlates a received DTV and overlay signal against a locally generated overlay signal from an overlay sequence generator 109. The output from the cross-correlator 108 is then fed to a phase adjustor 110, which adjusts the phase of the locally generated signal overlay signal by retarding or advancing the clocking of the locally generated overlay signal to maximize the largest peak of the signal from the cross-correlator 108. (See, e.g., Grabb, column 4, line 66, through column 5, line 10, and Fig. 1.)

In contrast, claim 1 recites “comparing a parameter of the analysis result with a predetermined threshold to produce a comparison result,” and “shifting a phase of said receiver signal when said parameter of said analysis result is beyond said predetermined threshold.” Nothing in Grabb discloses or suggests that a threshold be used by the cross-correlator 108, the overlay sequence generator 109, the phase adjustor 110, or any other element manipulating the received overlay signal. Furthermore, nothing in Grabb discloses or suggests that the phase adjustor 110 alter the clocking of the locally generated signal only when a signal from the cross-correlator 108 is beyond a predetermined threshold.

Grabb simply discloses that the phase adjustor 110 retards or advances the clocking of the locally generated overlay signal to maximize the largest peak of the signal from the cross-correlator 108. This need not be done through the use of a comparison of an analysis result against a predetermined threshold, as recited in claim 1. In fact, given the language of retarding or advancing the clocking, it is entirely possible that the device simply uses a measurement of the relative change in the output of the cross-correlator as a measure of when the phase should be advanced or retarded.

Thus, Grabb does not disclose or suggest the recited use of a threshold. And such a missing claim element may not be established simply by a probability or possibility. Just because the Examiner asserts that the device in Grabb *may* use a threshold is not sufficient to show such a teaching. Therefore, the Examiner has failed to set forth a prima facie case of anticipation with respect to claim 1.

Claims 2-19 all ultimately depend from claim 1 and are allowable for at least the reasons given above for claim 1.

Claim 20 recites “a comparator configured to compare a parameter of the analysis result with a predetermined threshold to produce a comparison result,” and “a phase shifter configured to shift a phase of the receiver signal when said parameter of said analysis result is beyond said predetermined threshold.” As noted above with respect to claim 1, Grabb does not disclose or suggest the use of a predetermined threshold, nor does it disclose or suggest shifting a phase of a receiver signal when a parameter of an analysis result is beyond a threshold.

Claims 21-35 all ultimately depend from claim 20 and are allowable for at least the reasons given above for claim 20.

Claim 36 recites a “means for comparing a parameter of the analysis result with a predetermined threshold to produce a comparison result,” and a “means for shifting a phase of the receiver signal when said parameter of said analysis result is beyond said predetermined threshold.” As noted above with respect to claim 1, Grabb does not disclose or suggest the use of a predetermined threshold, nor does it disclose or suggest shifting a phase of a receiver signal when a parameter of an analysis result is beyond a threshold.

Claims 3 and 22 further recite that the predetermined threshold is a magnitude of the correlation. Grabb does not disclose or suggest the use of a threshold, as noted above. But even

if the device in Grabb were operated as the Examiner suggests, nothing in Grabb discloses or suggests the specific feature that such a threshold be a magnitude of the correlation.

Claims 4 and 23 further recite that the predetermined threshold is a predetermined signal to noise ratio. Grabb does not discloses or suggest the use of a threshold, as noted above. But even if the device in Grabb were operated as the Examiner suggests, nothing in Grabb discloses or suggests the specific feature that such a threshold be a predetermined signal to noise ratio.

Claims 5 and 24 further recite that the predetermined threshold is a predetermined bit error rate. Grabb does not discloses or suggest the use of a threshold, as noted above. But even if the device in Grabb were operated as the Examiner suggests, nothing in Grabb discloses or suggests the specific feature that such a threshold be a predetermined bit error rate.

Claims 6 and 25 further recite that the predetermined threshold is a predetermined value of a lock parameter. Grabb does not discloses or suggest the use of a threshold, as noted above. But even if the device in Grabb were operated as the Examiner suggests, nothing in Grabb discloses or suggests the specific feature that such a threshold be a predetermined value of a lock parameter.

With regard to claims 3-6 and 21-25, the Examiner is engaging in further speculation about what the device in Grabb *might* do, not what it is disclosed as doing. And it is impermissible for the Examiner to read teachings into a reference that are not there. For example, just because a signal will have an inherent bit error rate or signal-to-noise value does not disclose or suggest using those parameters to set a threshold value.

Claims 13 and 32 further recite that the UWB signal comprises multilevel pulses. As defined in the specification (e.g., on page 7, lines 25-31), a multilevel signal is one that has multiple amplitude levels for various different pulses. For example, one embodiment of

multilevel bi-phase signals is disclosed as having values of $(+1, -1, +a_1, -a_1, +a_2, -a_2, \dots, +a_N, -a_N)$, while one embodiment of multilevel multi-phase signals is disclosed as having values of $(a_i \exp(j2\pi\beta/N) \mid a_i \in \{1, a_1, a_2, \dots, a_K\}, \beta \in \{0, 1, \dots, N-1\})$. Nothing in Grabb discloses or suggests the use of multilevel pulses as defined in Applicants' specification.

Claims 15-17 recite various operations that are performed based on whether the recited analysis result is beyond the predetermined threshold. Since Grabb does not disclose or suggest the use of such a threshold, it likewise does not suggest performing functions based on whether such a threshold is met.

Furthermore, claim 16 recites changing a value of the predetermined threshold, and claim 17 recites using multiple thresholds, including an initial threshold and an extreme threshold, and changing the predetermined to the initial threshold when the changed predetermined threshold is beyond the extreme threshold. Even if Grabb were operated as the Examiner suggests, nothing in Grabb discloses or suggests the use of multiple thresholds or changeable thresholds.

Claim 35 recites a location mechanism configured to locate a first phase angle at which said parameter of the analysis result is beyond said predetermined threshold, and a phase scan range setting mechanism configured to define a phase scan range relative to said first phase angle. By using these features, the recited system can narrow down to a specific phase scan range by using a threshold determination. Nothing in Grabb discloses or suggests this feature.

Even if Grabb operated as the Examiner suggests, nothing in Grabb would teach locating a specific phase angle at which a threshold was met, and then defining a phase scan range relative to the specific located phase angle. According to the Examiner, the phase of the signal is measured over a time period of 360 degrees (See, e.g., Grabb, Fig. 6). But since at the time disclosed in Fig. 6 of Grabb, the device is operating dynamically, such a measurement will

repeatedly take place over 360 degrees regardless of anything else. Thus, the device cannot be properly said to define a phase scan range relative to any specifically located phase angle.

Claim 37 recites “analyzing the incoming UWB signal in light of the receiver signal over a phase range less than 2π radians to produce an analysis result,” “locating a desired phase angle within the phase range using the analysis result,” and “shifting a phase of the receiver signal to the desired phase angle.” In this way the recited system can more quickly achieve synchronization by examining less than an entire cycle of the code wheel. This feature is not disclosed or suggested by Grabb.

The Examiner has asserted that Grabb discloses that the cross-correlator outputs a signal to the phase adjustor 110 and adjusts the phase to maximize the largest peak of the cross-correlator. This, he asserts, is the same as matching phase angles. However, claim 37 recites more than just matching phase angles. As noted above, claim 37 requires first locating a desired phase angle within a phase range less than 2π radians, then shifting a phase of the receiver signal to the desired phase angle.

Nothing in Grabb discloses locating a desired phase angle within a phase range less than 2π radians. In fact, as the Examiner notes with reference to Fig. 6, the system of Grabb operates dynamically over repeated cycles of 360 degrees (i.e., 2π radians). Claim 37 requires that the number of available phase angles be limited to a specific phase range. Grabb does not suggest such a restriction, but appears to require that a phase range of 360 degrees be used.

Again, simply asserting that the phase range *may* be shortened does not provide the suggestion that it *should* be. As noted above, a missing element may not be established simply by a probability or possibility. Therefore, for at least the reasons given above, the Examiner has failed to set forth a prima facie case of anticipation with respect to claim 37.

Claims 38-64 all ultimately depend from claim 37 and are allowable for at least the reasons given above for claim 37.

Claim 65 recites “an analyzer configured to analyze the incoming UWB signal in light of the receiver signal over a phase range less than 2π radians to produce an analysis result,” “a locator configured to locate a desired phase angle within the phase range using the analysis result,” and “a phase shifter configured to shift a phase of the receiver to the desired phase angle.” As noted above with respect to claim 37, Grabb does not disclose or suggest analyzing an incoming UWB signal over a phase range less than 2π radians, and then shifting a phase of a receiver to a desired phase angle within the phase range.

Claims 66-87 all ultimately depend from claim 65 and are allowable for at least the reasons given above for claim 65.

Claim 88 recites a “means for analyzing the incoming UWB signal in light of the receiver signal over a phase range less than 2π radians to produce an analysis result,” “means for locating a desired phase angle within the phase range using the analysis result,” and “means for shifting a phase of the receiver signal to the desired phase angle.” As noted above with respect to claim 37, Grabb does not disclose or suggest analyzing an incoming UWB signal over a phase range less than 2π radians, and then shifting a phase of a receiver to a desired phase angle within the phase range.

Claims 39-43 and 67-71 all further limit the phase range (to less than π radians, less than $\pi/2$ radians, less than $\pi/3$ radians, less than $\pi/4$ radians, or less than $\pi/8$ radians). The Examiner asserts that in Grabb the phase range can be shortened by an amount, but notes that the process will have to be repeated. But this is not the same as limiting the phase range. If 360 degrees are

used to determine the proper phase, then whether it is constructively split up into groups or not is irrelevant. In reality, the entire 360 degrees (i.e., 2π radians) is used to determine the phase. And it would be improper to call this using a limited range, when it in fact is not limiting the range of phases at all.

Claim 45 recites using a threshold analysis result. As noted above with respect to claim 1, nothing in Grabb discloses or suggests the use of a threshold.

Claims 47 and 74 further recite that the analysis result comprises a bit error rate. Grabb does not disclose or suggest locating a desired phase angle within a phase range using a bit error rate.

Claims 48 and 75 further recite that the analysis result comprises a signal to noise ratio. Grabb does not disclose or suggest locating a desired phase angle within a phase range using a signal to noise ratio.

Claims 49 and 76 further recite that the analysis result comprises a lock parameter. Grabb does not disclose or suggest locating a desired phase angle within a phase range using a lock parameter.

With regard to claims 47-49 and 74-76, the Examiner is engaging in further speculation about what the device in Grabb *might* do, not what it is disclosed as doing. And it is impermissible for the Examiner to read teachings into a reference that are not there. For example, just because a signal will have an inherent bit error rate or signal-to-noise value does not disclose or suggest using those parameters to locate a desired phase angle within a phase range.

Claims 56 and 84 further recite that the UWB signal comprises multilevel pulses. As defined in the specification (e.g., on page 7, lines 25-31), a multilevel signal is one that has multiple amplitude levels for various different pulses. For example, one embodiment of

multilevel bi-phase signals is disclosed as having values of $(+1, -1, +a_1, -a_1, +a_2, -a_2, \dots, +a_N, -a_N)$, while one embodiment of multilevel multi-phase signals is disclosed as having values of $(a_i \exp(j2\pi\beta/N) \mid a_i \in \{1, a_1, a_2, \dots, a_K\}, \beta \in \{0, 1, \dots, N-1\})$. Nothing in Grabb discloses or suggests the use of multilevel pulses, as defined in Applicants' specification.

Claim 57 recites "changing a value of said phase range," and "repeating said steps of comparing and shifting using the changed phase range." Just as claim 37 does not disclose using a phase range less than 2π radians, so too does it fail to disclose changing the values of such a phase range.

Claim 58 recites "scanning a phase range along a phase range vector to a vector maximum phase;" claim 59 recites "changing the vector maximum phase," and "repeating said step of scanning until said vector maximum phase is beyond a predetermined extreme vector maximum phase;" and claim 60 recites "reducing the vector maximum phase." Just as Grabb does not disclose using a phase range less than 2π radians, so too does it fail to disclose scanning along a phase range vector. And even if it did show scanning phases, it clearly doesn't disclose changing a vector maximum phase, using an extreme vector minimum phase, or reducing a maximum vector phase.

Therefore, based on at least the reasons given above, Applicants respectfully request that the Examiner withdraw the rejection of claims 1-6, 12-17, 20-25, 31-49, 55-61, 64-77, and 83-88 under 35 U.S.C. § 102(e) as being allegedly anticipated by Grabb.

Rejection Under Richards et al., Raphaeli et al., and Kaku

The Examiner has rejected claims 7-11, 26-30, 50-54, and 78-82 under 35 U.S.C. § 103(a) as being allegedly unpatentable over Grabb in view of United States Patent No. 6,239,741 to Fontana et al. ("Fontana"). Applicants respectfully traverse this rejection.

Claims 7-11 depend from claim 1 and are allowable for at least the reasons given above for claim 1. Claims 26-30 depend from claim 20 and are allowable for at least the reasons given above for claim 20. Claims 50-54 depend from claim 37 and are allowable for at least the reasons given above for claim 37. And claims 78-82 depend from claim 65 and are allowable for at least the reasons given above for claim 65. Nothing in Fontana cures the deficiencies in Grabb noted above.

In addition, claims 9, 28, 52, and 81 recite maintaining a substantially constant bit error rate. Similarly, claims 10, 29, 53, and 82 recite obtaining a substantially constant noise in the amplified incoming UWB signal. These features are not disclosed in Grabb or Fontana, alone or in combination.

The Examiner notes that Grabb does not disclose amplifying the received signal. And although Fontana does disclose low noise, high gain wideband amplification, it does not disclose or suggest that either the bit error rate be kept constant or that the noise in an incoming UWB signal be maintained as substantially constant. Although it is certainly *possible* for a device like Fontana to perform the functions that the Examiner suggests, nothing in Grabb or Fontana suggests that they actually be performed. As a result, there is no motivation in Fontana to modify the device of Grabb as the Examiner suggests. Thus, nothing in Grabb or Fontana, alone or in combination, discloses or suggests the features recited in claims 7-11, 26-30, 50-54, and 78-82 noted above.

Based on at least the reasons given above, Applicants respectfully request that the Examiner withdraw the rejection of claims 7-11, 26-30, 50-54, and 78-82 under 35 U.S.C. § 103(a) as being allegedly unpatentable over Grabb in view of Fontana.

The Examiner has rejected claims 18, 19, 62, and 63 under 35 U.S.C. § 103(a) as being allegedly unpatentable over Grabb in view of United States Patent No. 5,841,808 to Rizzo et al. ("Rizzo"). Applicants respectfully traverse this rejection.

Claims 18 and 19 depend from claim 1 and are allowable for at least the reasons given above for claim 1. Claims 62 and 63 depend from claim 37 and are allowable for at least the reasons given above for claim 37. Nothing in Rizzo cures the deficiencies in Grabb noted above.

Claims 19 and 63 recite that determining a lock parameter comprises calculating $L = \text{sign}(m_1 - Ks_1)$, where wherein L is a lock parameter, m_1 is a first measurement of a signal-to-noise relationship, K is a constant value, and s_1 is a second measurement of a signal-to-noise relationship. Nothing in Rizzo suggests this specific measurement of a lock parameter.

Thus, nothing in Grabb or Rizzo, alone or in combination, discloses or suggests the features recited in claims 18, 19, 62, and 63 noted above.

Based on at least the reasons given above, Applicants respectfully request that the Examiner withdraw the rejection of claims 18, 19, 62, and 63 under 35 U.S.C. § 103(a) as being allegedly unpatentable over Grabb in view of Rizzo.

Claim Amendments

By this amendment, Applicants have amended claims 32 and 74-77 to recite a system rather than a method. Since claim 32 depends from claim 20, and claims 74-77 depend from claim 65, the fact that these were system claims was inherent in the claims as filed, and the use of

the term "method" was a clear typographical error. Thus, the scope of the amended claims has not been altered in any way.

Conclusion

Accordingly, Applicants respectfully submit that the claims, as amended, clearly and patentably distinguish over the cited references of record and as such are deemed allowable. Such allowance is hereby earnestly and respectfully solicited at an early date. If the Examiner has any suggestions, comments, or questions, calls are welcome at the telephone number below.

Although it is not anticipated that any additional fees are due or payable, the Commissioner is hereby authorized to charge any fees that may be required to Deposit Account No. 50-1147.

Respectfully Submitted,



Brian C. Altmiller
Reg. No. 37,271

Date: January 30, 2004

Posz & Bethards, PLC
11250 Roger Bacon Drive
Suite 10
Reston, VA 20190
Phone (703) 707-9110
Fax (703) 707-9112
Customer No. 23400